REMARKS

In an Office Action dated June 10, 2005, the Examiner objected to claim 15. Applicants are amending claim 15 to make that claim dependent from claim 9 as suggested by the Examiner.

The Examiner rejected all 16 claims under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,341,988 (Rein). Applicants respectfully disagree with the grounds for this rejection.

Rein teaches arrangements using a single source of cooling, for providing individual control of temperatures to each of a plurality of zones, for example, of an air conditioning system for a building. The temperature of each zone is individually controllable and more or less cooling air is supplied to each zone under the control of an individual controller. In addition, a master controller can send signals to override the signals being provided by the controller for each zone in case insufficient cooling capacity (or heating capacity) is available for the building.

In contrast, Applicants' invention relates to arrangements wherein there are two sources of cooling for each unit of electronic equipment and the controllers for each unit control which or both sources are to be used for that unit. The objective of Applicants' invention is to provide adequate cooling capacity for the electronic equipment in each of the plurality of units from the two sources of cooling capacity, and to arrange that when one of the two sources is inadequate or otherwise below its rated capacity, that the cooling source from the other source take over for as many of the units as possible and to ensure that the critical units are supplied with adequate cooling. Note that the system of Rein is aimed primarily at cooling offices wherein the inhabitants while being uncomfortable if inadequate cooling is supplied can still function, in contrast, Applicants' invention is aimed primarily at electronic equipment which is likely to fail if it is not supplied with adequate cooling.

In terms of the specific grounds for the rejection of Applicants' claims, the Examiner states:

> Rein teaches...at least two sources of cool air (see FIG. 1 and column 7, line 64 to column 8, line 24).

Applicants' assert that FIG. 1 shows only one source of cool air (54) for the zone 34 being cooled. For the Examiner's convenience, Applicants are showing the complete text of column 7, line 64 - column 8, line 24:

> During normal cooling operation, heat enters each zone 34 from internal sources such as people 36, lights 38 and equipment 40, and from external sources such as infiltration through walls 42, conduction through walls 42, and radiation through windows 44. Warm air is removed from each zone 34 by the return air stream 46 and is replaced by cool supply air from a terminal unit 48. At an air handler 50, warm return air rejects heat to cool water flowing within the heat exchange coil 52. The warm water exiting from the coil 52 rejects its heat to refrigerant within a water chiller 54 located elsewhere. The refrigerant in turn rejects heat to a condenser 56.
>
> During normal heating operation, heat leaves each zone 34 and is replaced by warm supply air from the terminal unit 48. A heating element in the terminal unit 48 can supply the heat, or heat can be extracted at the air handler 50 from water flowing within the heat exchange coil 52.
>
> The basic control objective in the zone 34 controlled by an air distribution system 32 is to add or subtract heat by means of the conditioned air supply so that the net amount of heat gained, lost, and stored within the zone 34 is balanced at a comfortable temperature. Conventional variations in this arrangement are contemplated such as, for example, (1) the elimination of the water chiller loop so that the return air itself is in heat exchange relationship with the refrigerant, or (2) the use of a cooling tower instead of the condenser 56. [Emphasis added]

Applicants see nothing in this passage to indicate that there are two sources of cool air. Only terminal unit 48 supplies cool (or warm) air.

The Examiner cites that the Abstract and FIGs. 1-3 teach a damper in series with each of said [two] sources. For the Examiner's convenience, Applicants will quote the Abstract:

> A hierarchical control system including a central receiver; a first communications medium operably connecting the central receiver to at least one controller; and a controller operably connected to the central receiver by the first communications medium. The system also includes a sensor for sensing conditions; a second communication medium; and a transmitter for transmitting the sensed conditions from the sensor to the central receiver via the second communications medium. The central receiver also includes receiver for receiving transmissions on the second communications medium and a transmitter for retransmitting the transmissions on the first communications medium.

Applicants respectfully assert that there is nothing in the Abstract or FIGs. 1-3 to show a damper in series with each of two sources of cool air. FIG. 3 does show two dampers in

series with the single source of cooling air to each zone. Presumably one of the dampers is under the control of the local processor and the other is under the control of a master processor in location 66. However, there is no teaching of a damper in series with "each of said [two] sources".

Accordingly, Applicants respectfully submit that Rein does not teach the subject matter of claims 1 and 9.

The Examiner rejected claims 2 and 10 over the teachings of the Abstract, FIG. 17, and column 23, lines 15-57. For the Examiner's convenience, Applicants will quote column 23, lines 15-57:

> FIG. 17 is a flow chart 302 showing the operation of a typical zone or personal comfort sensor 58,110. After beginning the flow chart 302 at step 304 with an initialization routine, the zone or personal comfort sensor 58,110 is activated or awakened from a dormant state at step 305 by either (1) a hardware timed interrupt on the order of every two seconds, (2) the receipt of a personal comfort data packet 100 from a personal comfort sensor 110, (3) a change of state such as an input from the timed override switch 70, the setpoint device 60, or the mode of operation selector 62, or (4) the receipt of a command data packet 104 from a setup tool 320. The zone or personal comfort sensor 58,110 then monitors the environment of the zone 34 at step 306 by sampling and filtering the temperature 64, by sampling the timed override switch 70 and the mode of operation switch 62, and by sampling a setpoint wheel 60. A software timer is periodically checked at step 308 to ensure that the zone or personal comfort sensors 58, 110 sends data no more often than 30 seconds but at least every five minutes, whether or not a change of state has occurred. Additionally, any time a change of state occurs or a command or data packet 104,100 has been received, data is transmitted at steps 310 and 312. At step 314 the zone sensor 58 determines if a command data packet 104 has been received either by a physical connection 316 or by the third communications medium TX3. If a command data packet 104 has been received, and at least 30 seconds has elapsed since the last transmission, the data packet 104 is transmitted at step 312, otherwise the zone of personal comfort sensor 58,110 goes to sleep at step 315. Going "dormant" is a method of conserving a non-renewable power source 59 such as a battery 59. If the power source 59 is continually renewed, it is not necessary to render the zone sensor 58 or personal comfort sensor 110 dormant. Each time data is transmitted, the software timer accumulating time since the last transmission is reset. Depending upon which embodiment of the present invention is being implemented, the zone or personal comfort sensor 58, 110 can transmit data at step 312 on either the second communication medium TX2, or the third communication medium TX3. Monitoring is then recommenced at step 306.

Applicants respectfully assert that while the Abstract, the cited passage, and FIG. 17 teach a hierarchical arrangement wherein a master controller sends signals to the controllers for each of the individual zones there is no teaching in this passage to suggest that the signals are used "to ensure that special critical equipment is adequately cooled in the presence of adverse conditions" as recited in Applicants' claims 2 and 10.

The Examiner rejected claims 4-8 and 12-16 over the teachings of Rein in the Abstract, FIGs. 1-12, column 11, lines 7-52, and column 19, lines 14-51. For the Examiner's convenience, Applicants will quote column 11, lines 7-52, and column 19, lines 14-51.

Column 11, lines 7-52:

> FIG. 3 shows a block diagram of the wireless communication system and the air distribution system of the present invention. A first communications medium TX1 such as the hard wired communications bus 72 links a plurality of air handling controllers 68 to each other, to the central receiver 66, and optionally to a building automation system 76. The building automation system 76 allows the controllers 68 and zones 34 to be centrally monitored and automatically coordinated. Each controller 68 can exchange information via the first communications medium TX1. This first communications medium TX1 is implemented as the communications bus 72, which in the preferred embodiment is a twisted pair wire communications link transferring data in a serial fashion. The first communications medium TX1 can also be implemented as a power line carrier or the like.
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> Additionally, each controller 68 can receive setpoints and other commands from the building automation system 76, and can transmit status and other information to the building automation system 76. Commands from the building automation system 76 can either be directed to a specific controller 68, or can be in the form of a general broadcast to all controllers 68. Such a general system broadcast might provide outside air temperature or might indicate that the power level of a particular zone sensor 58 has depleted, and that controllers 68 relying on information from that particular sensor should substitute a default sensor. In cases where it is not possible to substitute a default sensor because (1) a default sensor has not been designated, (2) the default sensor is known to be inoperative, (3) if the controller 68 is not connected to the bus 72, or (4) the controller is being used as a stand alone controller, the controller 68 operates using the last operating mode and setpoints with which the controller 68 has been provided.
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> Referring to FIGs. 2 and 3, a source 78 of supply air from an air handling unit 50 is provided by a supply air duct 80. A plurality of branch ducts 82 interconnect the supply air duct 80 to the plurality of zones 34 whose environment is to be controlled. Each branch duct 82 has a damper 74 or its equivalent controlled by the controller 68 of the particular zone 34 or zones 34 to which the branch duct 82 supplies conditioned air. Within each zone 34 is a zone sensor 58

which transmits information to the central receiver 66 using a second communication medium TX2.

Column 19, lines 14-51:

The third embodiment has the advantage that airflow and other data sensed by the personal comfort sensors 110 can be supplied to the controllers 68 without the necessity of implementing a third communication medium TX3. Additionally, the interchangeability of the same sensors 58 and the personal comfort sensors 110 provides greater user flexibility in designing economical and efficient air distribution systems, particularly where there is a cost disparity between either the personal comfort sensors 110 and the zone sensors 58, or between the second communication medium TX2 and the third communication medium TX3. If desired, a zone sensor 58 can be used transmitting on the third communication medium TX3.

FIG. 12 is an example of the third embodiment of the present invention as applied to a two story building 146. The two story building 146 has two floors 148 and 150, the first floor 148 of which includes two large areas 152 and 154. The large area 154 is a single zone controlled by a single controller 156 and a single zone sensor 158. The other large area 152 is serviced by two controllers 160 and 162. The controller 160 receives zone data packets 86 from a zone sensor 164 and a personal comfort sensor 166 connected to the zone sensor 164 by a cable type link 168 which implements a third communication medium TX3. The controller 162 is supplied with zone sensor data packets 86 by a zone sensor 170 and a personal comfort sensor 172. The zone sensor 170 is provided with data from the personal comfort sensor 172 over a fiber optic link 174 which implements the third communication medium TX3.

The second story 150 of the building 146 includes offices 176 separated by half walls 178. Each office 176 includes a portable personal comfort sensor 180 which transmits zone data packets 86 over the second communication medium TX2 to the central receiver 66 for subsequent retransmission on the first communications medium TX1 to the controller 68.

Applicants respectfully submit that there is nothing in these teachings which teach that the main controller can send an equipment shutdown signal to pre-selected ones of the plurality of apparatus. This is a signal to shut down apparatus, not just to control the flow of cool air. (This refers to claims 4 and 12.)

Applicants assert that there is nothing in the teachings of the above paragraphs to anticipate the sending of damper control request signals to pre-selected ones of the plurality of apparatuses, as recited in claims 5 and 13.

Claims 6 and 14 recite shutoff switches to allow the individual processors for directly controlling the dampers to shut down the electronic equipment. This is not taught in the cited passage.

Claims 7 and 15 recite an arrangement for use with the two sources of cool air (which are not taught by Rein) wherein only one of the dampers is normally open with the result that only one of the sources of cool air is normally used for a particular piece of equipment and dependent claims 8 and 16 recite that both of the damper switches can be open even in the case wherein only one of the damper switches is normally open. This is to provide for the possibility that under some circumstances both sources of cool air can be used even if normally they need not be used. Again, this is not taught by Rein and is not relevant for Rein because, as repeatedly stated above, Rein has only a single source of cool air for each zone.

Accordingly, Applicants respectfully submit that the subject matter of claims 1-2, 4-10, and 12-16 should be held allowable over the teachings of Rein. Applicants also submit that claims 3 and 11, dependent from claims 1 and 4, should be held allowable as being dependent from an allowable claim. Alternatively, Applicants also submit that claims 2-8 and 10-16 should be held allowable as being dependent from claims 1 and 9 argued above as being allowable.

Accordingly, Applicants respectfully request that the Examiner reconsider the grounds for rejection of all 16 claims, allow these claims (as amended in the case of claim 15), and pass the application to issue.

If the Examiner feels that a voice or fax communication would help to advance the prosecution of this application, the Examiner is invited to call or fax Applicants' attorney at 630 469-3575.

Respectfully submitted
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Date: August 3, 2005